AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended): ~~Method~~ A method for optimizing the sequence order of optical passive filters in WDM (Wavelength Division Multiplex) multi-channel transmission systems, said optical passive filters making up mux/demux structures at nodes of the WDM system, the method comprising:

setting a number of parameters identifying the WDM system;

defining the attenuation profile over different channels of the WDM system, by using said parameters;

determining an order sequence of the different channels in a mux/demux structure from the attenuation profile;

determining an insertion loss profile of the different channels from the order sequence;

determining a minimum span length between nodes resulting from applying said order sequence;

wherein the parameters identifying the WDM system comprise:

Number of channels: **N;**

Set of wavelengths: $\lambda_1 \ldots \lambda_N$ [nm] of the N channels;

Fiber loss profile: $\mathbf{F_{loss}(\lambda)}$ [dB/km] of the optical fiber used in the WDM system;

Insertion loss model: $\mathbf{I_{loss1}}$, and Δ_{att} [dB] of the mux/demux structure, where

$\mathbf{I_{loss}}$ value gives the losses measured between the input (common) port and the N outputs: $\mathbf{I_{loss}(n) = I_{loss1} + \Delta_{att}(n-1)}$, $\mathbf{I_{loss1}}$ is the insertion loss of the first port of the structure; Δ_{att} is the incremental attenuation between to adjacent ports of the structure; **n** is the port position;

Span length target: **Slt** [km] as required for the WDM system;

Power Budget: **Pb** [dB] used between the nodes of the WDM system;

Intermediate nodes: **Inodes,** maximum number of intermediate non-regenerative nodes

~~wherein the sequence order of the optical passive filters is determined depending on the attenuation profile and variations of the insertion loss profile of the WDM system, in order to maximise the minimum span length between nodes~~.

2. (currently amended): ~~Method~~ The method according to claim 1, wherein ~~said method comprises the following steps:~~

~~setting a number of parameters identifying the WDM system;~~

~~defining the attenuation profile over the channels of the WDM system, by using said parameters;~~

~~determining the order sequence of channels in the mux/demux from the attenuation profile;~~

~~determining the insertion loss profile of the different channels from that sequence;~~

~~determining the minimum span length between nodes resulting from applying said channel sequence~~

the sequence order of the optical passive filters is determined depending on the attenuation profile and variations of the insertion loss profile of the WDM system, in order to maximize the minimum span length between nodes.

3. (currently amended): ~~Method~~ The method according to ~~claim 2~~claim 1, wherein the step of determining the insertion loss profile of the different channels from that sequence is made for different numbers of intermediate non-regenerative nodes, from no nodes to a given maximum.

4. (canceled).

5. (currently amended): ~~Method~~ The method according to ~~claim 4~~claim 1, wherein the step of defining the attenuation profile over the channels of the WDM system, comprises:

substituting each wavelength of the vector $\lambda_1 \ldots \lambda_N$ in the attenuation profile $\mathbf{F_{loss}(\lambda)}$;

~~getting~~ determining the specific attenuation coefficient vector for each channel of the system $\mathbf{Ac_1 \ldots Ac_N}$ [db/km] $= \mathbf{F_{loss}(\lambda_1 \ldots \lambda_N)}$ [dB];

multiplying the $\mathbf{Ac_1 \ldots Ac_N}$ vector for the span length target **Slt** to ~~get~~ determine the fiber attenuation vector $\mathbf{Fatt(\lambda_1) \ldots Fatt(\lambda_N)} = \mathbf{Slt * Ac_1 \ldots Ac_N}$ [dB];

determining the maximum attenuation of the vector $\mathbf{Fatt(\lambda_1) \ldots Fatt(\lambda_N)}$:

$\mathbf{Mav} = \max\,[\mathbf{Fatt(\lambda_1) \ldots Fatt(\lambda_N)}]$ [dB];

normalizing the vector $\mathbf{Fatt(\lambda_1) \ldots Fatt(\lambda_N)}$ with the subtraction:

$\mathbf{Att(\lambda_i) = Mav - Fatt(\lambda_i)}$ [dB];

ordering from zero to the highest value of attenuation to ~~get~~ determine a vector with non-negative increasing values, describing the shaping of the different attenuations of the fiber:

$\mathbf{A_1 \ldots A_N}$ = order $\mathbf{[Att(\lambda_1) \ldots Att(\lambda_N)]}$ [dB];

applying the ordering by attenuation values, to ~~get~~ determine a Lambda vector $\mathbf{\lambda o_1 \ldots \lambda o_N}$[nm], that contains the various wavelengths with a generally non-ordered sequence.

6. (currently amended): ~~Method~~ The method according to claim 5, wherein the step of determining the order sequence of channels in the mux/demux from the attenuation profile comprises:

creating the vector **Diff,** difference between two adjacent elements of **A** vector: $\mathbf{Diff_i}$ = $\mathbf{A_{i+1} - A_i}$ [dB] , with $\mathbf{i = 1 \ldots N\text{-}1}$;

ordering and reducing the elements of **Diff** to a set of different values of attenuation (each value within a given tolerance), obtaining the vector :

$\mathbf{D_1 \ldots D_M}$ [dB], with $\mathbf{M \leq N\text{-}1}$, each value of **D** determining a mux/demux structure having a subgroup of channels, with the following iterative calculation:

FOR i = 1 to **M**;

FOR j = 1 to **N** - 1;

IF [$\mathbf{(A_{j+1} - A_j) \leq D(i)}$]

THEN

GROUP the channel j+1 with the channel j in the $\mathbf{\lambda o}$ vector,

ELSE

Don't GROUP the j+1 channel with the previous one(s), it will be the first element of a new group,

END FOR

END FOR

using the subgroups created to build the mux-demux filter order sequence where each subgroup defines an inverted mux/demux order of channels, each subgroup having a couple of numbers, **Pinf, Psup,** between 1 and N, corresponding to the positions of the first and the last element of the subgroup.

7. (currently amended): ~~Method~~ The method according to claim 6, wherein the step of determining the insertion loss profile I.L. of the different channels comprises:

computing, for each channel of a subgroup, the I.L. with the expression:

λ**loss** = I_{loss} **(Pinf)** + I_{loss} **(Psup)** [dB];

wherein for any number of intermediate nodes, **Inodes**, the total I.L. per channel is: λ**loss * (Inodes + 1)** [dB];

for each channel the Span length (λ) is:

Span length (λ) = [**Pb** - λ**loss * (Inodes + 1)**] / **Ac(λ)** [km]; and

the span length of the WDM system being the minimum of Span length (λ):

Span length = min [Span length($\lambda_1 \ldots \lambda_N$)] [km].

8. (canceled).

9. (currently amended): ~~Device~~ A device comprising a mux/demux structure of passive optical filters for WDM (Wavelength Division Multiplex) multi-channel transmission system, wherein the mux/demux structure is obtained by: ~~with the method of claim 1~~

setting a number of parameters identifying the WDM system;

defining the attenuation profile over different channels of the WDM system, by using said parameters;

determining an order sequence of the different channels in a mux/demux structure from the attenuation profile;

determining an insertion loss profile of the different channels from the order sequence;

determining a minimum span length between nodes resulting from applying said order sequence;

wherein the parameters identifying the WDM system comprise:

Number of channels: **N;**

Set of wavelengths: $\lambda_1 \ldots \lambda_N$ [nm] of the N channels;

Fiber loss profile: $\mathbf{F_{loss}}(\lambda)$ [dB/km] of the optical fiber used in the WDM system;

Insertion loss model: $\mathbf{I_{loss1}}$, and Δ_{att} [dB] of the mux/demux structure, where

$\mathbf{I_{loss}}$ value gives the losses measured between the input (common) port and the N outputs: $\mathbf{I_{loss}(n) = I_{loss1} + \Delta_{att}(n-1)}$, $\mathbf{I_{loss1}}$ is the insertion loss of the first port of the structure; Δ_{att} is the incremental attenuation between to adjacent ports of the structure; **n** is the port position;

Span length target: **Slt** [km] as required for the WDM system;

Power Budget: **Pb** [dB] used between the nodes of the WDM system;

Intermediate nodes: **Inodes,** maximum number of intermediate non-regenerative nodes.

10. (currently amended): ~~Device~~ The device as in ~~claim 8~~claim 9, wherein said mux/demux structure of passive optical filters is made of pass-band thin-film 3-port passive optical filters.

11. (currently amended): WDM (Wavelength Division Multiplex) multi-channel transmission systems comprising mux/demux structures of passive optical filters as in ~~claim 8~~claim 9.

12. (currently amended): CWDM (Coarse Wavelength Division Multiplex) multi-channel transmission systems comprising mux/demux structures of passive optical filters as in ~~claim 8~~claim 9.

13. (canceled).

14. (currently amended): A computer readable medium having a program recorded thereon, said computer readable medium comprising computer program code means adapted to perform ~~all the steps of claim 1, when said program is run on a computer~~a method for optimizing

the sequence order of optical passive filters in WDM (Wavelength Division Multiplex) multi-channel transmission systems, said optical passive filters making up mux/demux structures at nodes of the WDM system, the method comprising:

setting a number of parameters identifying the WDM system;

defining the attenuation profile over different channels of the WDM system, by using said parameters;

determining an order sequence of the different channels in a mux/demux structure from the attenuation profile;

determining an insertion loss profile of the different channels from the order sequence;

determining a minimum span length between nodes resulting from applying said order sequence;

wherein the parameters identifying the WDM system comprise:

Number of channels: **N;**

Set of wavelengths: $\lambda_1 \ldots \lambda_N$ [nm] of the N channels;

Fiber loss profile: $\mathbf{F_{loss}(\lambda)}$ [dB/km] of the optical fiber used in the WDM system;

Insertion loss model: $\mathbf{I_{loss1}}$, and Δ_{att} [dB] of the mux/demux structure, where

$\mathbf{I_{loss}}$ value gives the losses measured between the input (common) port and the N outputs: $\mathbf{I_{loss}(n) = I_{loss1} + \Delta_{att}(n-1)}$, $\mathbf{I_{loss1}}$ is the insertion loss of the first port of the structure; Δ_{att} is the incremental attenuation between to adjacent ports of the structure; **n** is the port position;

Span length target: **Slt** [km] as required for the WDM system;

Power Budget: **Pb** [dB] used between the nodes of the WDM system;

Intermediate nodes: **Inodes,** maximum number of intermediate non-regenerative nodes.